144

No. 09-412 (2)

In The
Supreme Court of the United States

SMC CORPORATION AND
SMC CORPORATION OF AMERICA,

Petitioners,

v.

NORGREN, INC. AND UNITED STATES
INTERNATIONAL TRADE COMMISSION,

Respondents.

ON PETITION FOR WRIT OF CERTIORARI TO
THE UNITED STATES COURT OF APPEALS
FOR THE FEDERAL CIRCUIT

BRIEF IN OPPOSITION TO PETITION FOR WRIT OF CERTIORARI

Carl F. Manthei
Counsel of Record
Curtis J. Ollila
OLLILA LAW GROUP, LLC
2060 Broadway, Suite 300
Boulder, Colorado 80302
(303) 938-9999

Counsel for Respondent Norgren

Dated: November 5, 2009

THE LEX GROUP DC • 1750 K Street N.W. • Suite 475 • Washington, DC 20006
(202) 955-0001 • (800) 815-3791 • Fax: (202) 955-0022 • www.thelexgroup.com

QUESTION PRESENTED

Whether Petitioners have presented compelling reasons to grant the Petition, where the Federal Circuit's Opinion reversing the ITC's claim construction does not conflict with a decision of this Court or a Court of Appeals, and where Petitioners do not claim the Federal Circuit's ruling properly implicates an important federal question that has not been settled by this Court.

CORPORATE DISCLOSURE STATEMENT

IMI Americas, Inc. is the parent company of Norgren, Inc. No publicly held company owns 10% or more of its stock.

TABLE OF CONTENTS

Page

QUESTION PRESENTED FOR REVIEW i

CORPORATE DISCLOSURE STATEMENT ii

TABLE OF CONTENTS iii

TABLE OF AUTHORITIES v

STATEMENT OF THE CASE 1

REASONS FOR DENYING THE PETITION 3

ARGUMENT 3

I. The CAFC Decision was Based Solely on Intrinsic Evidence 5

II. The CAFC did not Resolve any Fact Disputes 7

III. Extraneous Arguments Made by SMC 8

A. Contrary to SMC's Contention, A *Generally Rectangular Clamp* Does Not Require a *Flange* with Projections on all Four Sides 8

B. Technical Experts Are Not Expected to Opine on the Legal Meaning of Writings 9

IV. The Issue of Deference Might be Considered in a Proper Case by the *en banc* Federal Circuit 10

CONCLUSION 11

APPENDIX:

Appendix H – U.S. Pat. No. 5,372,392 dated December 13, 1994 ..... 200a

TABLE OF AUTHORITIES

Page(s)

CASES

Amgen, Inc. v. Hoechst Marion Roussel Inc.,
469 F.3d 1039 (Fed. Cir. 2006),
en banc, certiorari denied by
Amgen, Inc. v. Hoechst Marion Roussel Inc.,
550 U.S. 953, 127 S. Ct. 2270,
167 L. Ed. 2d 1123, 75 USLW 3531,
75 USLW 3605, 75 USLW 3609
(U.S. May 14, 2007) 11

Cybor Corp. v. FAS Techs., Inc.,
138 F.3d 1448 (Fed. Cir. 1998)
en banc 3, 4, 5, 11

Markman v. Westview Intruments, Inc.,
52 F.3d 967 (Fed. Cir. 1995) *en banc* 10

Merck & Co., Inc. v.
Teva Pharmaceuticals USA, Inc.,
395 F.3d 1364, (Fed. Cir. 2005),
rehearing and rehearing *en banc* denied by
Merck & Co., Inc. v.
Teva Pharmaceuticals USA, Inc.,
405 F.3d 1338 (Fed. Cir. 2005),
certiorari denied by
Merck & Co., Inc. v.
Teva Pharmaceuticals USA, Inc.,
546 U.S. 972, 126 S. Ct. 488,
163 L. Ed. 2d 384, 74 USLW 3121,
74 USLW 3245, 74 USLW 3247
(U.S. Oct 17, 2005) 10

Phillips v. AWH Corp.,
415 F.3d 1303 (Fed. Cir. 2005),
en banc; certiorari denied by
Phillips v. AWH Corp,
546 U.S. 1170, 126 S. Ct. 1332,
164 L. Ed. 2d 49, 74 USLW 3464,
74 USLW 3471 (U.S. Feb 21, 2006) ..... *passim*

Winans v. New York & Erie R.R.Co.,
62 U.S. (21 How.) 9-10

RULE

Sup. Ct. R. 15 1

STATEMENT OF THE CASE

Supreme Court Rule 15 requires that this brief address any misstatements of fact and/or law or risk waiving any challenge to the same should certiorari be granted. Accordingly, in addition to any errors pointed out in the Argument section *infra*; the following misstatements were made by SMC in the Statement of the Case section of their petition:

1. The idea that SMC's "mounting ears" on the sides of their FRLs[1] is something distinct and separate from a *flange*. P. 2 of SMC's brief (all cites in this response are to SMC's brief or appendix unless otherwise noted). This is just a play on words. SMC's mounting ears are no more than two projections on opposing sides of SMC's flange. Furthermore, SMC's flanges are generally rectangular and have ports.

2. SMC implies, by showing depictions of an SMC FRL and a Norgren FRL, that this case is dependent on a comparison of the flanges of the two units. P. 2-3. This is not the law. Norgren's flange is but one embodiment of the '392[2] flange, while SMC's is another. The issue of the infringement of SMC's flange should be determined by comparing it to the language of the correctly construed claims of the patent; something the CAFC[3] did, but the ALJ[4]

---

[1] FRL means filter, regulator and lubricator.

[2] U.S. Patent No. 5,372,392, the '392 patent.

[3] United States Court of Appeals for the Federal Circuit.

[4] Administrative Law Judge.

did not do, as discussed *infra*. See *Phillips v. AWH Corp.*, 415 F.3d 1303, 1312 (Fed. Cir. 2005) *en banc*.

3. The ALJ's finding that the flange must have projections on four sides is "not surprising" since a rectangle has four sides. P. 4. This is a non-sequitor. Of course, the rectangular shape requirement does not, by any means, necessitate projections on all four of its sides. It means exactly what is says: that the flange, as a whole, is generally rectangular. Claim 1 also requires that the invented clamp engage the generally rectangular flange, but never says nor requires that it engage projecting rims on all four sides. In fact, nothing in the entire patent ever says or implies that this must be the case. The *urging together* function of the clamp (claim 1 of the '392 patent, 215a)[5] may be accomplished by only two sides of both the clamp and flange having corresponding projections/ beveled edges. See claim 4 of the '392 patent and Column 3 (pp. 216a and 213a) (the *only* explanation in the patent of how the clamp works and it involves only the clamp's "pivotally mounted side," and its opposite side engaging corresponding sides of the flange. Two sides of the clamp and their corresponding mates on the flange are never mentioned).

4. SMC's comment about the ALJ's criticism of Norgren's expert witness is totally irrelevant to the issues before this Court, and, in any event, is not well-taken. P. 4. The ALJ's interpretation of the role of a technical expert is erroneous as discussed, *infra*.

---

[5] 200 series page numbers refer to Appendix attached to this brief.

5. Contrary to SMC's cite from the ALJ's decision (p. 6), Norgren did offer an explanation as to why the clamp and the flange were generally rectangular. Connected FRLs must be attached so that they remain in a specific orientation to one another in order that the F's, the R's and the L's perform their intended functions. Any other shape of clamp and flange would not accomplish this.

6. The ALJ was not consistent with the *Phillips* case. As the CAFC pointed out, the ALJ read a limitation seen in illustrations of the preferred embodiment into claim 1. p. 8a. The CAFC, on the other hand, was consistent with *Phillips* by analyzing the four corners of the intrinsic evidence to see if the term *flange* was either specially defined by the inventor or if its ordinary meaning was narrowed by some clear and unequivocal language therein.

7. Also contrary to SMC's assertion, the CAFC did hold that the *flange* had to be a rectangle. 8a.

REASONS FOR DENYING THE PETITION

SMC has petitioned this Court to hear this case solely on the issue of whether the CAFC should defer to a trial court, or in this specific case, to an ALJ, on patent claim construction issues. This would entail revisiting and perhaps reversing *Cybor Corp. v. FAS Techs., Inc.*, 138 F.3d 1448 (Fed. Cir. 1998) *en banc*, a case that holds that rulings concerning patent claim construction are always reviewed *de novo* by the CAFC.

The opinion in this case by the CAFC does not conflict with prior decisions of this Court or any United States Court of Appeals, nor does it properly implicate an important federal question that has not yet been settled by this Court, as discussed *infra*. Rather, SMC seeks to revisit decisions that are slightly more than a decade old and is asking this Court to reverse them.

As SMC points out, this issue has been festering in the CAFC for the past eleven years and a number of intellectual property law scholars and judges have opined that *Cybor* ought to be revisited either in this Court or by an *en banc* session of the CAFC. Norgren does not disagree that, given a proper case, the *Cybor* decision might be dusted off and reviewed. However, this is *not* the proper case for that review.

The rationale behind deferring to the trial court or ALJ is that a judge before whom evidence is presented live is in a superior position to an appellate panel reviewing a cold record, to determine the credibility of that evidence. This superiority only exists where the tribunal is tasked with deciding a factual dispute. When the dispute is purely one of legal interpretation of documents, such as a patent and its prosecution history, no judge or scholar has recommended that deference be given a trial court or ALJ. This view is clear from the cited authorities in SMC's petition. On page 15 of the petition, an opinion from the ABA is presented that urges that "ultimate claim construction" be left as something to be reviewed *de novo*, and only fact determinations should be reviewed on a "clear error" basis.

To change the existing law and defer to trial judges on purely legal matters of document interpretation would not only reverse *Cybor* but would establish a precedent at odds with the great body of law on the legal construction of documents.

Should a case that turns on the resolution of the conflicting testimony of expert witnesses on, for example, the technical meaning of an obscure term not defined overtly or implicitly in the intrinsic evidence, come before either the *en banc* CAFC or this Court, then it might be prudent for the *Cybor* ruling to be looked at anew. The case now before this Court does not present such a situation. Nowhere in the claim construction opinion of the CAFC does that court allude to a single word of testimony or an extrinsic exhibit of any kind. In short, claim construction in this case was decided entirely on the language found within the four corners of the intrinsic evidence. It was a purely *legal* decision based on the court's interpretation of cold documents. Because of its cumulative experience of reviewing thousands of patent disputes over the years, the three-judge panel of the CAFC, was actually in far superior position to interpret the patent-in-suit and its antecedent history than an ALJ who was hearing his second patent case.

I. *The CAFC Decision was Based Solely on Intrinsic Evidence.*

The only issue before the CAFC was the proper construction of the claim term *generally rectangular ported flange*. Although not a claim element *per se*, construction of the term was essential for a correct interpretation of the phrase describing the patented

clamp found in the patent's only independent claim, claim 1: *adapted . . . to engage . . . the pair of [generally rectangular] ported flanges.*[6] The bone of contention between the parties was whether the flange was required to have four projecting rims or projections. SMC, with the concurrence of the ITC staff, argued that they were required while Norgren maintained that requiring four projecting rims violated the claim construction prohibition against importing limitations from a preferred embodiment into a claim. *Phillips v. AWH Corp.*, 415 F.3d 1303, 1320, 1323 (Fed. Cir. 2005) *en banc*.

The CAFC panel based its decision purely on its review of the various parts of the patent-in-suit. First the court noted that the terms *rims* and/or *projections* do not appear anywhere in the patent. 7a. Then, it pointed out that the only reference of any kind to projections was the patent's illustrations that showed projections on all four sides of the preferred embodiment.[7] 8a. The court went on to state that nothing in the '392 patent even suggested that the claimed flange must include four projections. 9a. The CAFC did precisely what SMC urges this Court (and other courts) to do when construing a patent: determine claim term meanings from the patent itself and not from extrinsic evidence.[8] The ALJ did just the opposite.

---

[6] The modifiers *generally* and *rectangular* come from the preamble to claim 1, as that claim was amended in the PTO and the parties agreed that they should properly modify *flange* in this phrase.

[7] Figures 3 & 4 of the '392 patent pp. 204a-205a.

[8] See pages 6-7 of SMC's petition.

He was the first jurist to use the terms *rims* and/or *projections*, terms that, as the CAFC said, appear nowhere in the '392 patent.

II. *The CAFC did not Resolve any Fact Disputes.*

In its ruling, the CAFC panel recited several relevant facts, but it did not, nor did it have any reason to, resolve any outstanding issues of fact, since they had already been agreed upon or were not necessary for its determination.

The CAFC recited that the problem the patent addressed was high production costs in factory assembly lines due to maintenance of the pneumatic devices known as FRLs and loose parts in existing FRL connectors or clamps. 2a. Therefore, the CAFC said, the patented device aspired to solve those problems by introducing a new clamp that allowed for the ready disconnection of FRLs for replacement or maintenance. 2a-3a. While there had been some colloquy at trial and in the ALJ's Initial Determination ("ID") about whether the disputed flange fit entirely within the patented clamp, the CAFC stated that the parties conceded that it did in the oral arguments before it. 7a—footnote 1.

Moreover, the CAFC did not see the necessity to resort to extrinsic evidence to determine the meaning of *flange*. From the patent alone, the CAFC found that a flange had to be *ported* and *rectangular*. 9a. The patent made no other requirements of the *flange*, except that it had to perform the function described for it. 9a.

Other fact disputes typical of patent infringement cases that often necessitate resolution at the trial court level, and discussed by Judge Mayer in his dissent in *Phillips* (cited by SMC in its petition), are simply missing in the present case.

III. *Extraneous Arguments Made by SMC.*

In its petition, SMC made two arguments that cry out for rebuttal because they are grossly misleading. On page 4 of SMC's petition, it contends that a *flange* must have four projecting rims due to claim 1's requirement that the patented clamp be *generally rectangular*. The other odd argument inserted by SMC is really a slur on Norgren's expert, John Wiskamp, attacking him for not having read the patent's prosecution history. Both arguments will be discussed *infra*.

A. Contrary to SMC's Contention, A *Generally Rectangular Clamp* Does Not Require a *Flange* with Projections on all Four Sides.

There is simply nothing about the modifier *rectangular* that mandates projections on a figure's four sides or on any one of its sides. The term only describes a shape—a two-dimensional figure of four sides formed by two sets of parallel lines with each corner defined by right angles. The configuration of SMC's infringing clamp and its corresponding flange, proves that a rectangular clamp and flange combination may exist without projections on all four sides of the flange. The ALJ found that SMC's clamp was *generally rectangular*. 69a of SMC's

petition. Yet its flange, that was designed to mate with the infringing clamp, while *generally rectangular* as found by the CAFC (9a.), had projections on only *two* sides. The ALJ's finding that the SMC clamp was *generally rectangular* was not appealed to the CAFC and is not properly before this Court. As the CAFC pointed out, there is nothing in the intrinsic evidence that even suggests that the clamp's rectangular shape mandates a flange with projections on all four sides. 10a.

B. Technical Experts Are Not Expected to Opine on the Legal Meaning of Writings.

While both SMC and Norgren presented testimony from *technical experts* about the state of the art, prior art, and the innovation represented by the '392 patent, none of those topics are before this Court. As this Court stated long ago, the purpose of technical experts in patent litigation is to inform the trial court of such things. It is clearly not the function of technical experts to interpret the meaning of the patent itself or its prosecution history.

> [P]rofessors or mechanics cannot be received to prove to the court or jury what is the proper or legal construction of any instrument of writing. A judge may obtain information from them, if he desire it, on matters which he does not comprehend, but cannot be compelled to receive their opinions as matter of evidence. *Winans v. New*

> *York & Erie R.R.Co.*, 62 U.S. (21 How.) at 101, cited in *Markman v. Westview Intruments, Inc.*, 52 F.3d 967, 981 (Fed. Cir. 1995) *en banc*.

SMC's counsel had no business even inquiring about Norgren's technical expert's interpretation of the intrinsic evidence. This argument has no place before this Court.

IV. *The Issue of Deference Might be Considered in a Proper Case by the en banc Federal Circuit.*

On several previous occasions, this Court has had the opportunity to revisit the deference issue in cases, like this one, that lacked a battle of live witnesses over an issue of fact. In each of these cases, the issue was not taken up by the *en banc* CAFC and certiorari was not granted here. Those cases include: *Merck & Co., Inc. v. Teva Pharmaceuticals USA, Inc.*, 395 F.3d 1364 (Fed. Cir. 2005), rehearing and rehearing *en banc* denied by *Merck & Co., Inc. v. Teva Pharmaceuticals USA, Inc.*, 405 F.3d 1338 (Fed. Cir. 2005), certiorari denied by *Merck & Co., Inc. v. Teva Pharmaceuticals USA, Inc.*, 546 U.S. 972, 126 S. Ct. 488, 163 L. Ed. 2d 384, 74 USLW 3121, 74 USLW 3245, 74 USLW 3247 (U.S. Oct 17, 2005) (NO. 05-236); *Phillips v. AWH Corp.*, 415 F.3d 1303 (Fed. Cir. 2005) *en banc*; certiorari denied by *Phillips v. AWH Corp*, 546 U.S. 1170, 126 S. Ct. 1332, 164 L. Ed. 2d 49, 74 USLW 3464, 74 USLW 3471 (U.S. Feb 21, 2006) (NO. 05-602); *Amgen, Inc. v. Hoechst Marion Roussel Inc.*, 469 F.3d 1039 (Fed. Cir. 2006) *en banc*, certiorari

denied by *Amgen, Inc. v. Hoechst Marion Roussel Inc.*, 550 U.S. 953, 127 S. Ct. 2270, 167 L. Ed. 2d 1123, 75 USLW 3531, 75 USLW 3605, 75 USLW 3609 (U.S. May 14, 2007) (NO. 06-1291).

This case is a poorer candidate for a review of the deference issue than those cited in the preceding paragraph. The CAFC panel that heard this case had so little trouble deciding the sole claim construction issue that it did so in record time (about a month from oral argument), did so unanimously, and issued a non-precedential opinion. The *en banc* Federal Circuit was asked by SMC to rehear the case on the issue of deference, but declined the petition without discussion.

Should a case be heard before an *en banc* session of the CAFC that turns on the credibility of live witnesses to one or more common patent fact issues such as: the meaning of technical terms whose definition does not appear in the intrinsic evidence, or the innovation presented by the patent item or process; then it would be appropriate for the CAFC, if it so chooses, to revisit *Cybor*. If the *en banc* CAFC exercises its discretion and decides such a case and has the first opportunity to determine a new standard on deference, then this Court may well deem it appropriate to review that ruling.

CONCLUSION

Petitioners have not established any compelling reasons for this Court to grant the Petition. Therefore, Respondents respectfully request the Petition be denied.

Respectfully Submitted,

Carl F. Manthei
Counsel of Record
Curtis J. Ollila
OLLILA LAW GROUP, LLC
2060 Broadway, Suite 300
Boulder, Colorado 80302
(303) 938-9999

Counsel for Respondent Norgren

November 5, 2009

APPENDIX

United States Patent [19]
Dunn et al.

[11] **Patent Number: 5,372,392**

[45] **Date of Patent: Dec. 13, 1994**

---

[54] **CONNECTING DEVICES**

[75] Inventors: **Myron Dunn**, Littleton; **Kevin T. Dickson**, Denver; **Urs T. Moeker**, Littleton, all of Colo.

[73] Assignee: **Norgren Co.**, Littleton, Colo.

[21] Appl. No.: **80,723**

[22] Filed: **Jun. 24, 1993**

[51] Int. Cl.[5] **F16L 25/04**
[52] **U.S. Cl.** **285/334.1**; 285/24; 285/364
[58] **Field of Search** 285/31, 334.1, 325, 285/326, 364, 365, 406, 407, 420, 424, 366, 367

[56] **References Cited**

U.S. PATENT DOCUMENTS

1,484,491	2/1924	Gutermann	285/424 X
3,338,599	8/1967	Hallman	285/424 X
3,432,185	3/1969	Rosengren	285/424 X
3,677,517	7/1972	Root et al	285/424 X

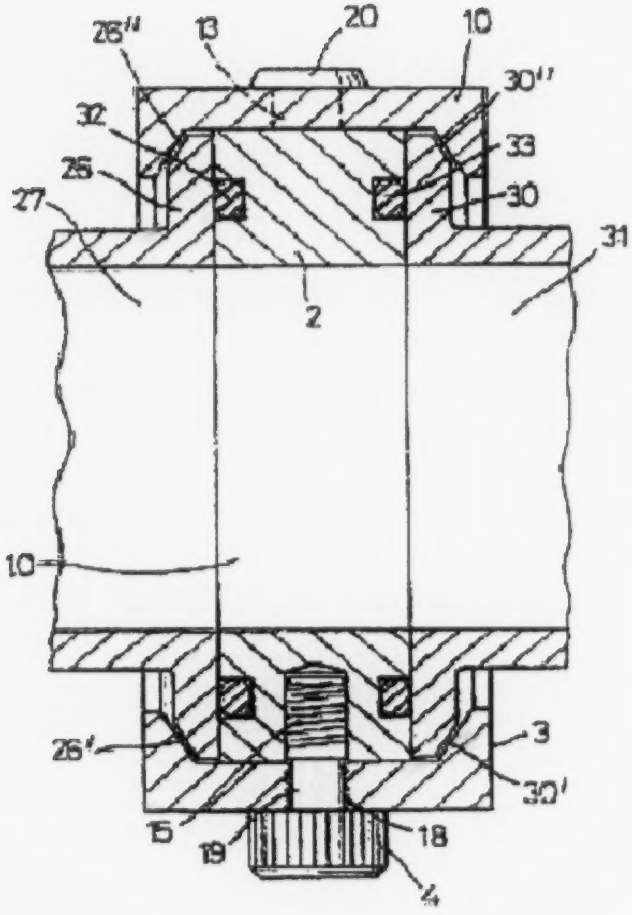
4,146,261 3/1979 Edmaier et al. 285/364
4,289,335 9/1981 Olbermann ..... 285/364 X
4,400,018 8/1983 Abbes et al. 285/31
4,915,418 4/1990 Palatchy ..... 285/367 X

Primary Examiner—*Dave* W. Arola
Attorney, Agent, or Firm—Cushman, Darby & Cushman

[57] **ABSTRACT**

A connecting device for sealingly connecting together a pair of modular compressed air conditioning units, for example a filter and a lubricator, comprises a generally rectangular clamp adapted to engage a pair of ported flanges formed respectively on the units to be connected so as to urge the units into fluid-tight communication with one another via an intermediate ported spacer retaining O-ring seals. One side of the rectangular clamp is pivotally mounted so that it can be pivoted out of its operative position to permit reception of the flanges into the clamp and then pivoted back into its operative position in which it can be releasably locked by tightening a bolt. The device may be unitary in nature, i.e. has no separate parts that might otherwise get lost, and is simple to manufacture and manipulate.

9 Claims, 4 Drawing Sheets


26''
13
20
10
30''
32
33
25
30
27
31
2
10
26'
3
30'
15
19
18
4

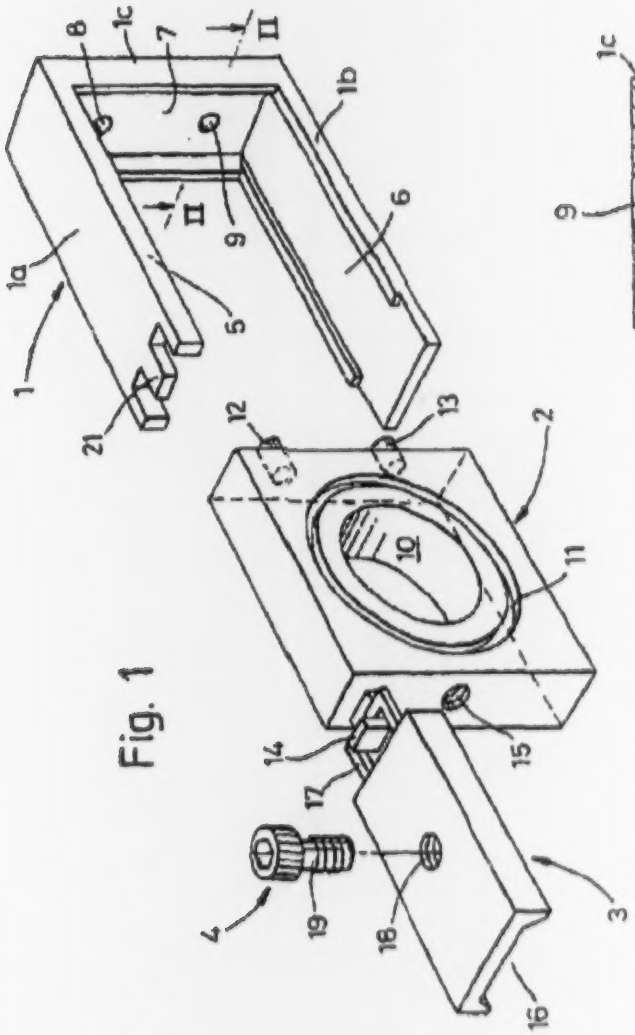


Fig. 1

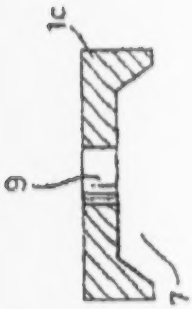


Fig. 2

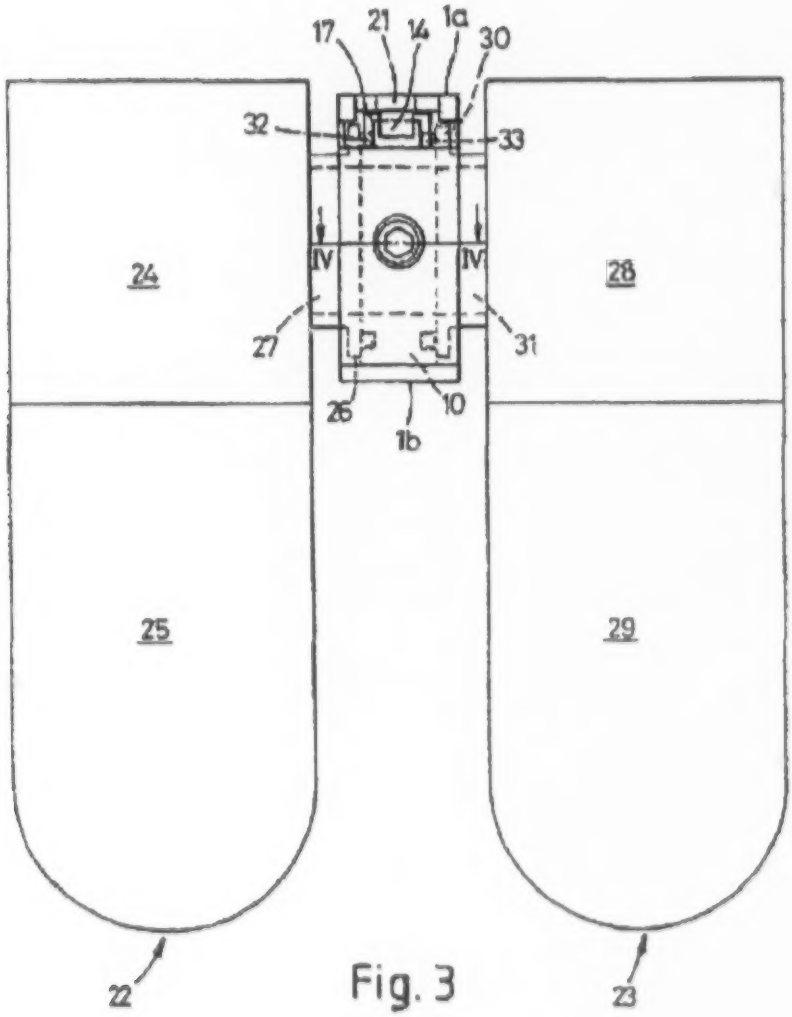


Fig. 3

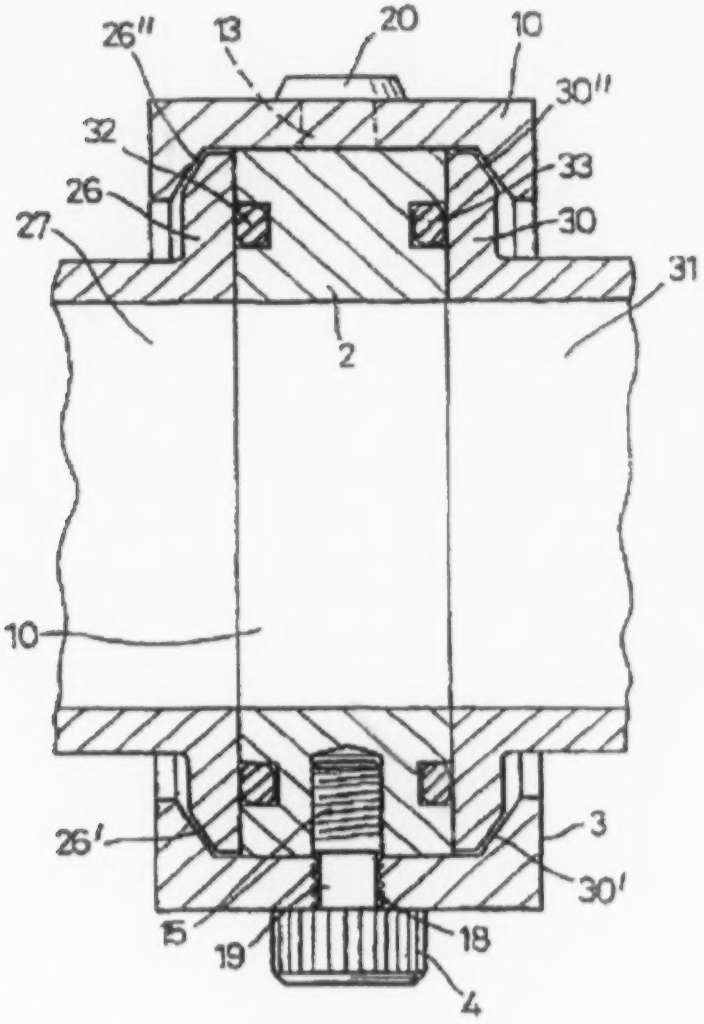


Fig. 4

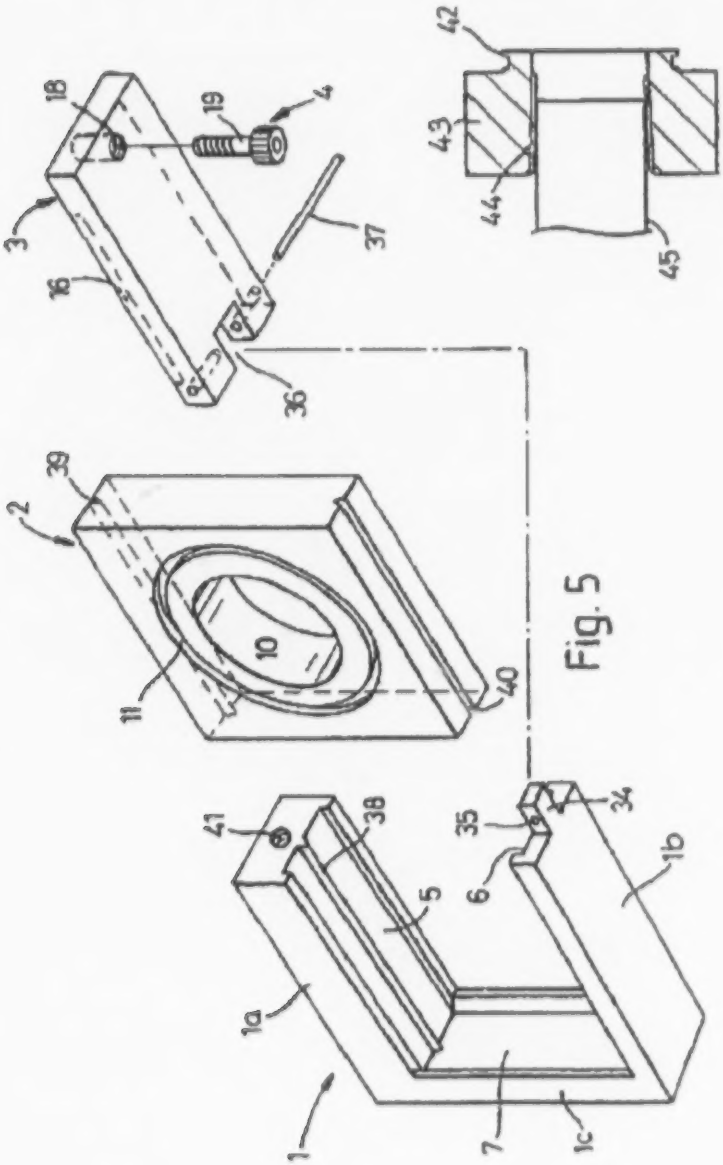


Fig. 6

Fig. 5

CONNECTING DEVICES

BACKGROUND OF THE INVENTION

1. Field

This invention relates to devices for connecting together fluid flow elements, especially but not exclusively fluid-conditioning units, such as, for example, pressure regulators, filters and lubricators for use compressed air systems.

2. Prior Art

As is well-known, a compressed air pipeline usually includes, intermediate the air compressor and a point of use, a plurality of conditioning units through which the compressed air sequentially passes. Depending on the circumstances, there will usually be two or more such units positioned adjacent to one another. For example, a typical arrangement might comprise a bank of three units, namely a filter, regulator and lubricator. In any event, it is known to provide "modular" units, and means for connecting them, whereby any number of units, as desired, may be readily connected together and into the compressed air pipeline so that the air will pass though them in the desired sequence, for example through a filter, pressure regulator and lubricator, in that order. Several connecting means have over the years been developed and commercialized but, whilst technically satisfactory, many have been relatively expensive to produce and/or have consisted of loose parts that have to be

assembled by the user, some of which are susceptible to being lost.

It is an object of the present invention to provide a simple, relatively inexpensive, preferably unitary connecting means for sealingly connecting together fluid flow elements which permits ready disconnection of the elements when desired.

SUMMARY OF THE INVENTION

In its broadest aspect, the present invention provides connecting means for contiguously connecting together a pair of fluid-flow elements, said means comprising a four-sided, generally rectangular clamp adapted, in its operative clamping position, to engage, in parallel relationship with one another, a pair of ported flanges associated respectively with said elements and further com comprising sealing means for establishing fluid-tight communication between the respective ports formed in said flanges, one of said sides of the clamp being pivotally mounted so that said one side can be pivoted out of said operative clamping position in order to permit reception of said flanges into the clamp and then pivoted back into said operative clamping position, and locking means to lock said one side in said operative clamping position.

In a preferred embodiment, the sealing means comprises a rectangular, plate-like spacer having a fluid flow bore extending through it between its two major faces, the bore being about the same diameter as the ports in said flanges, and the spacer is located centrally within the generally rectangular clamp by,

for example, one or more screws or rivets. Each major face of the spacer has a sealing surface circumscribing the opposite extremities of the bore and each sealing surface may support, for example in an annular groove, an O-ring seal. In such preferred embodiment, the locking means preferably comprises a screw or bolt held captive by the pivotally mounted side of the clamp and which can be screwed to tightness into a threaded bore formed in the spacer or in an adjacent side of the clamp. Preferably, the said one side of the clamp is pivotally mounted on the spacer or on an adjacent side of the clamp by means of a hinge-like mounting.

Accordingly, it will be appreciated that the connecting means of the invention may be a unitary structure in the sense that it has no loose parts that might otherwise get lost by the user.

BRIEF DESCRIPTION OF THE DRAWINGS

Preferred embodiments of the invention will now be described in more detail, by way of example only, with reference to the accompanying drawings in which:

FIG. 1 is a perspective view, in exploded form, of a connecting means constructed in accordance with the invention;

FIG. 2 is a cross-section on the line II-II of FIG. 1;

FIG. 3 is a front elevation of the connecting means of FIGS. 1 and 2 showing it connecting together a compressed air filter unit and a compressed air lubricator unit;

FIG. 4 is an enlarged cross-section on the line IV—IV of FIG. 3;

FIG. 5 is a similar view to that of FIG. 1 showing an alternative design of connecting means constructed in accordance with the invention; and

FIG. 6 is a sectional side elevation of a screw-threaded flange adapted to connect a pipeline to a compressed air conditioning unit using a connecting means of the invention.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring firstly to FIGS. 1 and 2, the connecting means basically comprises four separately formed components, namely a three-sided, generally U-shaped member 1, a rectangular spacer 2, an elongate member 3 and a bolt 4. As can be seen, the member 1 consists of three sections, namely a top section 1*a* a bottom section 1*b* and a rear section 1*c*. The sections 1*a*, 1*b*, 1*c* define, internally, respective channels 5, 6, 7 the walls of which, in use, receive between them and the spacer 2 the periphery of a ported, rectangular flange formed on each of the conditioning units to be joined together (see FIGS. 3 and 4). The walls of the respective channels 5, 6 defined by the top and bottom section la, 1*b* are parallel whereas those

defined by the channel 7 of the rear section 1*c* are tapered (see FIG. 2). The rear section 1*c* is formed with a pair of apertures 8, 9.

The rectangular spacer 2 has a bore 10 formed in it corresponding more or less to the diameter of the ports formed in the flanges of the units to be joined. Each major face of the spacer 2 is formed with an annular groove, one of which is shown at 11, for receiving an O-ring seal. The rear face of the spacer 2 is provided with a pair of cylindrical spigots 12, 13 dimensioned to pass through the apertures 8 and 9 respectively formed in the rear section 1*c* of the member 1 when the member 1 and the spacer 2 are assembled together, as is described later. The front edge face of the spacer 2 is formed with an L-shaped projection 14 and also with a tapped bore 15.

The elongate member 3 defines internally a channel 16 having tapering walls like those of the channel 7 defined by the section 1*c* of U-shaped member 1. The upper end of the elongate member 3 is provided with a generally U-shaped stirrup 17 pivotally hung on the L-shaped projection 14. The elongate member 3 is further formed with a tapped bore 18.

The bolt 4 is formed with a thread-relieved portion 19 whereby it may be received fully, and held captive, in the bore 18 of member 3 whilst still being able to rotate.

The components 1 to 4 will typically be made of a metal, although engineering plastics materials could be used for some or all of the parts.

In the assembled form of the connecting means, the spacer 2 is located symmetrically within the member 1 with the spigots 12 and 13 extending through, and projecting beyond, the apertures 8 and 9 respectively formed in the rear section 1c of the member 1, the projecting portions of the spigots 12 and 13 being upset to form a rivet-like connection between the member 1 and the spacer 2. This is clearly seen in FIG. 4, the rivet head on the spigot 13 being denoted by reference numeral 20. Alternatively, the spigots 12 and 13 could be dispensed with and the spacer 2 connected to the member 1 by screws or the like.

FIG. 3 shows a compressed air ftlter unit 22 and lubricator unit 23 (both units being depicted diagrammatically) connected together by the connecting means shown in FIG. 1 and FIG. 2. More particularly, the unit 22, as is well-known, comprises a body portion 24 from which depends a usually transparent bowl 25. The body 24 is provided with a rectangular connecting flange 26 having an outlet port 27 that communicates with the internals of the filter unit 22. The two opposed vertical edges of the flange 26 are bevelled as shown at 26' and 26" (see FIG. 4). The unit 22 is further provided with a like connecting flange and inlet port (not shown) on the opposite side of the body portion 24. The lubricator unit 23 similarly comprises a body portion 28, a depending bowl 29 and a rectangular connecting flange 30 (whose opposed vertical edges are bevelled as shown at 30' and 30") having an inlet port 31 that communicates with the internals of the lubricator unit 23. As in the case of the filter unit 22, the lubricator unit 23 is also formed with a like

connecting flange and outlet port (not shown) on the opposite side of the body portion 28.

The filter unit 22 and lubricator unit 23 are connected together by locating the flanges 26 and 30 into the connecting means with the member 3 in its raised position (the position shown in FIG. 1). The member 3 is then lowered and the bolt 4 engaged with the tapped bore 15. The bolt 4 is then tightened whereupon the tapered walls of the sections 1*c* and 3 co-operate with beveled portions 26', 26" and 30', 30" of the flanges 26 and 30 thereby urging the latter into sealing engagement with the spacer 2 and bringing the ports 27 and 31 into sealed communication with one another via the bore 10 formed in the spacer 2. Fluid tightness is ensured by O-rings 32 and 33 (the latter being located in the groove 11 shown in FIG. 1). Disconnection of the units may readily by achieved by reversing the above operation.

As will be appreciated, the preferred connecting means of the invention described above is, when its components are assembled together, unitary in nature, is relatively simple and inexpensive to manufacture and is simple to manipulate.

As will further be appreciated, the connecting means described above may be used "upside down" relative to the orientation specifically described above, i.e. wherein the member 3 is, in use, hingedly mounted on the spacer 2 near the bottom of the latter's front face, in which case the member 3 would be raised, rather than lowered, into its operative

position, followed by tightening of the bolt 4. The connecting means shown in FIG. 5 is shown in this orientation.

Referring in more detail to FIG. 5, the clamping means is in essence very similar to that shown in FIG. 1 to 4 and similar parts shown in FIG. 5 bear the same numerals used in those Figures. However, rather than the elongate member 3 being pivotally mounted on the spacer 2, it is mounted on the lower section 1*b* of the U-shaped member 1. More particularly, the upper section 1*a* is formed with a protrusion 34 having a lateral bore 35 externally through it. In the assembled connecting device, the protrusion 34 is located in a U-shaped cut-out 36 at the top of the member 3 and the two are retained together in hinge-like fashion by means of a pin 37 that passes through the bore 35.

Further, the spacer 2, which need not in this embodiment be rigidly secured to the clamp 1, is simply located in place within the clamp 1 by means of elongate triangular projections, one of which is shown at 38, which engage in correspondingly shaped recesses 39, 40 formed in the spacer 2.

Furthermore, the bolt 4, in the operative clamping position of the connecting means, engages in a threaded bore 41 formed in the front face of the upper section 1*a* of the clamp 1, rather than in a bore formed in the spacer 2.

Referring to FIG. 6, this shows a flange 42, like the flanges 26 and 30, formed integrally with a member 43 formed internally with threads 44

whereby a threaded compressed air pipeline 45 may be connected to a compressed air-conditioning unit such as 22 or 23 of FIG. 3 using a connecting device as shown in FIGS. 1 to 4 or in FIG. 5.

As will be appreciated, the connecting means of the invention may be used to connect together fluid-flow elements other than compressed air-conditioning units and compressed air pipelines such as, for example, hydraulic units or pipelines, water pipelines etc. Further, it will be appreciated that a variety of design modifications may be made to the connecting means specifically described above without departing from the scope of the appended claims.

What we claimed is:

1. Connecting structure for contiguously connecting together a pair of fluid-flow elements, each fluid flow element including flange so as to define a pair of ported flanges associated with the fluid-flow elements, said connecting structure comprising:

a four-sided, generally rectangular clamp adapted, in its operative clamping position, to engage, in parallel relationship with one another, the pair of ported flanges, one of said sides of the clamp being pivotally mounted so that said one side can be pivoted out of said operative clamping position in order to permit reception of said flanges into the clamp and then pivoted back into said operative clamping position,

sealing means for establishing fluid-tight communication between the respective ports formed in said flanges, and

locking means for releasably locking said one side in said operative clamping position, in which position the clamp urges the flanges towards one another thereby establishing together with said sealing means, said fluid-tight communication between said ports.

2. Connecting means according to claim 1 wherein said sealing structure comprises a generally rectangular, plate-like spacer located centrally within said clamp and having two opposed, major parallel faces for sealingly abutting respectively said ported flanges, said spacer having a fluid flow bore extending through it between said faces so as to provide a fluid path between the ports of said flanges and thus between the two elements.

3. Connecting structure according to claim 2 wherein each of said faces of the spacer is provided with a groove circumscribing said fluid flow bore, said grooves retaining respective resilient sealing means.

4. Connecting structure according to claim 2 wherein said one side of clamp, and the opposite side thereof, comprise internally tapered walls for engaging opposed peripheral sections of each of said ported flanges whereby said flanges will be urged into sealing engagement with said opposed major faces of the spacer upon application of said locking means.

5. Connecting including means for retaining said spacer within said clamp and structure according to claim 2 wherein said one side of the clamp and said spacer have coacting means for captively and pivotally mounting said one side on said spacer.

6. Connecting structure according to claim 5 wherein said locking means comprises a threaded fastener mounted on said one side of the clamp and engageable to tightness with a threaded port formed in the spacer to lock said one side in said operative clamping position.

7. Connecting structure according to claim 1 wherein said one side of the clamp is captively and pivotally mounted on an adjacent side of said clamp.

8. Connecting structure according to claim 7 wherein said locking means comprises a threaded fastener mounted on said one side of the clamp and engageable to tightness with a threaded port formed in the other adjacent side of the clamp.

9. Connecting structure according to claim 1, wherein said fluid flow elements include a first compressed air-conditioning unit and a second air-conditioning unit, said clamp being constructed and arranged to connect said first compressed air-conditioning unit to said second air-conditioning unit.

* * * * *

UNITED STATES PATENT AND TRADEMARK OFFICE

CERTIFICATE OF CORRECTION

PATENT NO. : **5.372,392**

DATED : **December 13, 1994**

INVENTOR(S) : **DUNN et al.**

It is certified that error appears in the above-indentified patent and that said Letters Patent is hereby corrected as shown below:

Column 4, line 46, following "including" insert – a generally rectangular ported –;

Column 4, line 67, change "means" to – structure –;

Column 4, line 68, change "structure" to – means –;

Column 5, line 20, following "connecting" insert – structure according to claim 2 –;

Column 5, lines 21-22, delete "structure according to clam 2".

Signed and Sealed this
Eleventh Day of April, 1995

Attest: /s/ Bruce Lehman
Bruce Lehman

Attesting Officer *Commissioner of Patents and Trademarks*